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MICRO-PHOTOGRAPHY WITH DRY-PLATES AND LAMP-LIGHT, AND ITS APPLICATION TO MAKING LANTERN POSITIVES.

By W. H. Walmsley, Philadelphia, Pa.

So much has been written and published on this theme within a short time that what I have to say will probably be familiar to most of you. But, inasmuch as the work I have done in that direction was entirely original, and may possess some points of simplicity and interest, I will briefly describe my processes, and exhibit the apparatus used in making both negatives and positives.

The dry-plates now furnished by the various makers, are of such uniform excellence, and so cheap, that but little is left to desire in that direction. They are a boon to the amateur photographer, whose value he is beginning to appreciate, since by their use results are obtainable by the novice, which a short time ago were only within the reach of the most expert photographer, with all the resources of a perfectly-fitted gallery at his command. Indeed, we are not going too far in asserting that work can be done by the dry process which would be impossible under the old wet one.

The apparatus required is simple and inexpensive. A camera, with bellows capable of being extended at least two feet, a double plate-holder, a package of sensitized dry-plates, of moderate rapidity, the chemicals for developing the same after exposure, and a printing-frame, being all that is absolutely required in addition to the microscope. Any lamp, giving a good light, will serve for the illumination of the object; and the same if covered with a sheet of ruby paper, will give a perfectly safe light for developing by. It is better, however, to use a separate lantern with ruby glass for this purpose. In practice I am accustomed to work with the Fiddian Illuminator in making the negative or printing the positive, and a red lantern in the development. Mr. Carbutt's ingenious lantern, which I have the pleasure of exhibiting to you, combines both these functions in one, in a very compact and practical form.

My work to the present time has been confined to powers not exceeding a half inch, and has been directed exclusively to enlargements, of a size suitable for projection upon the screen; for which purpose I have made the positives of the usual lantern size by printing in direct contact with the negatives; lamp-light alone being used in all stages of the work.

The ordinary ground glass focusing screen, will be found quite sufficient in using these lower powers, but is not sharp enough when we advance to higher ones. From the few experiments made in this direction I am led to infer that if the focusing is done upon a sheet of plain glass placed in the plate-holder and looked at through the latter (slides of course being removed), which in turn is replaced by the sensitized plate after the focus is fixed, we shall have no difficulty in obtaining an exact and sharp focus with any power employed.

The camera having been secured to a platform of the proper height, the microscope is inclined to a horizontal position, the eyepiece removed and the body (previously lined with a tube of dead black paper), inserted into the cirular opening in the front of the camera. In practice it was found advantageous to remove the draw-tube, and also to use a microscope with a short body, but neither of these are essential. The lamp is now to be placed in front of the microscope with its flame at such a height as to appear in the center of the stage, the mirror is to be swung aside or removed entirely, and the rays of light brought to a focus upon the object (previously placed upon the stage), by means of a bulls-eye condenser. If the stand carries an achromatic condenser, so much the better, as the illumination can therewith be made more equable and perfect. The focus having been coarsely adjusted, the magnified image of the object will be seen projected upon the ground glass of the camera, the bellows of which is now to be extended until the desired enlargement is reached, which in the case we are now considering, is of the proper size for a lantern transparency. This is readily arrived at by drawing with a pencil upon the ground glass a square or circle the size of a lantern -slide, and extending the bellows until the enlarged image fills the same; care being taken that the illumination is even and alike all over the field of view. The focusing is now to be completed with the fine adjusting-screw of the microscope, and when an absolutely sharp image is secured, the objective must be slightly withdrawn from the object in order to render the visual and chemical foci coincident. No definite rule can be given for the extent of this withdrawal, and each worker must experiment for himself with his own objectives, but it may be stated in a general way that about one-fiftieth of an inch is the distance required for a two-thirds objective, while for a one-half inch the one-two-hundredth is quite sufficient.

The focusing-cloth being thrown over the front of the camera and tube of the microscope to exclude any chance ray of light which might seek to enter, the frame containing the ground glass is removed and its place filled by the plate-holder, with its sensitized contents, and the slide removed for making the exposure. As to the length of the latter, no more exact time can be given than for landscape or portrait photography. It will depend upon the variations in subject and lens very greatly, the lower powers requiring less time than the higher. I have found that with powers from one and one-half to two-thirds inch, my best results were obtained from exposures varying from forty-five seconds to a minute and a half, but have never felt sure of the exposure until the after-development revealed what I had secured. Doubtless further experience will greatly diminish this uncertainty, as it does in other departments of photography.

I have found the ferrous oxalate to be the best developer for these lamp-light exposures, producing clear and intense negatives, which print much more easily than those developed with pyrogallic acid. It should be used rather weak (one-half ounce of proto-sulphate of iron to six ounces of the ferrous oxalate), and the image allowed to develop slowly, to bring out all the details. The fixing in hypo-sulphate of soda and subsequent washings are the same as with all other negatives.

I have found the rapid, or B plates, of Carbutt to be the best adapted to making negatives, but for the transparencies or positives an extra slow plate, specially prepared for the purpose, is necessary for the best results. The process is exceedingly simple. The negative is placed in the printing-frame film side up, and upon it is placed a sensitized plate film side down, thus bringing these two surfaces in contact. This, of course, must be done in the dark-room. The frame, with its contents, is then exposed to the light of a lamp or gas flame for a short time (varying from seven to twelve seconds), removed to the dark-room and developed in precisely the same manner as the negative. When dry and hard it is to be covered with a plate of thin glass, and the edges bound with needle-paper, when it will be ready for use in the lantern. Of course the negative must be perfectly dry and hard before the positives can be printed from it.

Although the process I have described is as yet crude and only partly developed, it certainly contains a germ from which great growths may be expected. By following it as given, any one can readily and cheaply produce slides admirably adapted to projections upon the screen even by the simplest oil lanterns, affording illustrations to classes obtainable a short time since, only at great cost of time and money. Doubtless the labor of future workers will so perfect the process that absolute success will attend each attempt, and perfect work be the result.

In conclusion, I may add that the cost of such an outfit as I have described and exhibited is but eighteen dollars. This includes the camera, with one double plate-holder and platform, a dozen of sensitized plates, and a Carbutt developing-lantern. The cost of plates is but sixty cents per dozen, and that of the chemicals employed too small to be taken into consideration. The printing-frames, for making the positives, cost less than a dollar.